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CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to prior U.S. Provisional Application Serial No. 60/445,635 filed February 7, 2003.

In a preferred embodiment, we describe polyvinylether polymers for delivery of polynucleotides to cells. The polynucleotide may be a DNA, RNA or synthetic polynucleotides. The cell may be *in vitro* or *in vivo*. A preferred polyvinylether is an amphiphilic polyvinylether. The polyvinylether polymers may contain monomer subunits selected from the list comprising: alkyl vinyl ethers, positively charged vinyl ethers, negatively charged vinyl ethers, aryl vinyl ethers, and polyethyleneglycol-containing vinyl ethers[1].

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In a preferred embodiment, we describe polymeric transfection agents comprising: polyvinylether polymers. The copolymerization of alkyl vinyl ether monomers and amine-protected vinyl ether monomers yields amphiphilic cationic polymers that can be used to delivery deliver polynucleotides to mammalian cells. Following polymerization of the

30 monomers, the amine protective group is removed to yield the positively charged amine.